Health and Safety Plan for the Radioactive Waste Management Complex Cold Test Pits for Operable Unit 7-13/14

1. INTRODUCTION

1.1 Purpose

This health and safety plan (HASP) establishes the procedures and requirements that will be used to eliminate or minimize health and safety risks to workers at the Radioactive Waste Management Complex (RWMC) cold (i.e., nonradioactive) test pits at the Idaho National Engineering and Environmental Laboratory (INEEL). The work that will be performed under this HASP includes all site preparation and restoration, general housekeeping, and grounds maintenance of the cold test pits to ensure their availability as a geotechnical resource in support of the Operable Unit (OU) 7-13/14 comprehensive remedial investigation and feasibility study (RI/FS). Operable Unit 7-13/14 is the comprehensive OU for Waste Area Group 7, which comprises the RWMC. The location of the RWMC at the INEEL is shown in Figure 1.

The preparation of this HASP is consistent with information found in the following documents:

- *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities* (NIOSH 1985)
- Companywide Safety and Health Manual 14A, *Safety and Health–Occupational Safety and Fire Protection*
- Companywide Safety and Health Manual 14B, *Safety and Health–Occupational Health*
- Companywide Manual 15A, *Radiation Control–INEEL Radiological Control Manual* (PRD-183).

The HASP governs all general activities at the cold test pits that will be performed by employees of Bechtel BWXT Idaho, LLC (BBWI), the current contractor for DOE-ID at the INEEL; subcontractors to BBWI; and employees of other companies or U.S. Department of Energy (DOE) laboratories. All work will be performed under the control of the following INEEL procedures for hazard mitigation:

- Standard (STD) -101, "Integrated Work Control Process"
- Management Control Procedure (MCP) -3562, "Hazard Identification, Analysis and Control of Operational Activities"
- MCP-3571, "Independent Hazard Review."

This HASP supports the INEEL Centralized Call Center (526-6212) and may be used by planners and managers along with the hazards screening profile checklist as a means for hazard identification and mitigation. People not normally assigned to work at the site such as representatives of DOE, the State of Idaho, the Occupational Safety and Health Administration (OSHA), and the EPA will be considered nonworkers who fall under the definition of "occasional site workers," as stated in the OSHA hazardous waste operations and emergency response (HAZWOPER) standard (29 CFR 1910.120 and 1926.65).

This HASP is exclusive of each technology-specific treatability study HASP, because each of these studies has a separate HASP that addresses the hazards associated with cold-test demonstration and actual operations inside the applicable INEEL facility and the Subsurface Disposal Area (SDA). Equipment supporting a treatability study may be offloaded, staged, and calibrated under the scope of this HASP.

The project manager will ensure that applicable elements of this HASP are reflected in all subcontracts and procurements if they are to be implemented at the cold test pit facility. The project manager also will be responsible for ensuring that the subcontractors participate in all work planning.

1.2 Scope of Work

The work that will be performed under this HASP includes all site preparation and restoration, general housekeeping, and grounds maintenance of the cold test pits to ensure their availability as a geotechnical resource in support of the OU 7-13/14 comprehensive RI/FS. The work associated with the cold test pits is designed to provide a nonhazardous environment for testing the equipment and processes funded by DOE Environmental Management (EM) –30, –40, and –50 programs including those used in treatability studies for the OU 7-13/14 activities requiring work control that will be performed in accordance with STD-101, MCP-3562, and MCP-3571, such as the following activities:

- Administrative operations of the test pit sites include administration of records, permits and procedure reviews, set up of work control zones, parking areas, establishing barriers and signs, access control and support operations (e.g., communication and administration of work control), material staging, storage, and mixing of chemicals and materials for simulated waste forms
- Site supervision, safety and health, quality assurance, and environmental oversight
- Excavation of soil for the fabrication of test pits or cells, staging clean soils for backfilling, and retrieval, examination, and disposition of materials after treatment studies are completed
- Fabrication or assembly of test cell components including building containers, instrumentation, simulated waste matrix, tanks, boxes, or structures in support of treatability studies
- Maintenance of the work sites in support of operations including weed control, noxious weed and range-fire mitigation, monthly monitoring against the storm water pollution prevention plan (DOE-ID 2000a), management self-assessments, sanitation, water, electrical power, barriers, access roads, layout and site survey, and photographic documentation
- Site scheduling and approval of individual project activities (e.g., drilling, grout emplacement, and operation of test equipment)
- Site restoration and winterization tasks.

The RWMC will be responsible for performing most phases of support work under *IAG-15 Interface Agreement Between RWMC and Waste Area Group 7 Operable Unit 7-13/14 Treatability Studies Project* (INEEL 2000) unless the work will be subcontracted or other work arrangements are made. Prior to project startup, materials, supplies, and subcontractor equipment will be delivered to the site and unloaded in designated storage areas. Mobile cranes, forklifts, and other heavy equipment will be used during this stage of cold test pit operation.

Subcontractors will be issued an authorization to mobilize upon approval of documentation required by the contract specifications and the data requirements of this HASP. This will include submittal of operating procedures and safety manuals, training records, medical qualifications, quality assurance plans, and health and safety documentation.

1.3 Idaho National Engineering and Environmental Laboratory Site Description

The INEEL is located in the northwestern portion of the Eastern Idaho Snake River Plain in southeast Idaho, located approximately 58 km (34 mi) west of Idaho Falls, Idaho, and encompasses 2,305 km^2 (890 mi^2).

The U.S. Atomic Energy Commission (now DOE) established the INEEL (originally called the National Reactor Testing Station) in 1949 as a site for building and testing a variety of nuclear facilities. The INEEL also has been the storage facility for transuranic (TRU) radionuclides and low-level radioactive waste since 1952. The INEEL currently supports the engineering and operations efforts of DOE and other federal agencies in areas of nuclear safety research, reactor development, reactor operations and training, nuclear defense materials production, waste management technology development, and energy technology and conservation programs. The U.S. Department of Energy Idaho Operations Office (DOE-ID) has responsibility for the INEEL and designates authority to operate the INEEL to government contractors. The BBWI provides management and operating services to the majority of INEEL facilities.

In 1987, a consent order and compliance agreement (COCA) (DOE-ID 1987) was entered into between DOE and the EPA in accordance with the Resource Conservation and Recovery Act (RCRA) (42 USC § 6901 et seq.), Section 3008(h). The COCA required DOE to conduct an initial assessment and screening of all solid waste and hazardous waste disposal units at the INEEL and set up a process to conduct any necessary corrective actions. On July 14, 1989, the INEEL was proposed for listing on the National Priorities List (NPL) (54 FR 29820). The listing was proposed by the EPA under the authorities granted to the EPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC § 9601 et seq.). The final rule that listed the INEEL on the NPL was published on November 21, 1989 (54 FR 48184). As a result of having the INEEL on the NPL, DOE, the U.S. Environmental Protection Agency (EPA), and the Idaho Department of Health and Welfare entered into the Federal Facility Agreement and Consent Order (FFA/CO) on December 9, 1991 (DOE-ID 1991). Under the FFA/CO, the INEEL is divided into 10 waste are groups (WAGs). The WAGs are further subdivided into OUs. The RWMC has been designated as WAG 7 and consists of 14 OUs. Operable Unit 7-13/14 combines the scope and schedule for the OU 7-13 TRU pits and trenches RI/FS and the OU 7-14 comprehensive RI/FS for WAG 7.

1.4 Site Description

1.4.1 Review of Subsurface Disposal Area Geology

The cold test pits are located on the Snake River Plain in the gently rolling semiarid desert of southeastern Idaho. Surface topography of the region is determined by young basalt lava flows and associated volcanic features (e.g., cinder cones, vents, pressure ridges, and collapsed lava tubes). Average annual precipitation is 8.7 in. (22 cm). The depth-to-water table at the SDA is about 580 ft (177 m) (Becker et al. 1998).

Soils are shallow at the cold test pit areas (30-ft [9-m] maximum depth to basalt) and are composed of clay, silt, and sand. Soil mineralogy is predominately clay minerals (50 wt%), quartz (37.5 wt%), calcite (10 wt%), and iron oxyhydroxide and other minerals (2.5 wt%). Soil-moisture pH is alkaline (about 8 ± 0.5). The Eh is oxidizing and is equivalent to air. The soil pH is buffered by the calcite-water-toCO_2 interactions and by oxygen in the air. The soil moisture is saturated with respect to calcite, super-saturated with dolomite (Wood and Norrell 1996), iron minerals, and other soil minerals. Caliche, very common in the SDA, is a hard, impermeable, concrete-like soil naturally cemented by calcite.

The bedrock is a series of generally horizontal basalt lava flows separated by thin, discontinuous sedimentary interbeds. Consequently, the overall structure is analogous to a layer cake. The morphology of the basalt flows is highly variable from dense, massive material to vesicular and highly fractured rock. Lava tubes are common. The interbeds are primarily unconsolidated sediments, cinders, and volcanic breccia. Air permeability measurements (Weidner et al. 1992) indicate that the permeability varies through five orders of magnitude, from virtually infinite permeability to 0.05 Darcy. Measurements of natural air-pressure fluctuation and attenuation as a function of depth indicate that the air permeability of the basaltic material sharply decreases at some depth between 71 and 105 ft (22 and 32 m) below ground surface. The material at depths less than 71 ft (22 m) is homogeneous in terms of air permeability, as is the material below 105 ft (32 m).

The cold test pits comprise the Cold Test Pit South and the Cold Test Pit North. The locations of the two pits at the SDA are shown in Figure 2.

1.4.2 Cold Test Pit South

Cold Test Pit South was established in 1988 and has been used for many treatability studies. The area is located 200 yd (183 m) south of the RWMC boundary. Storage tanks, waste boxes, cardboard drums, and concrete culverts have been used as containers for simulated waste. Some containers from past studies remain buried there. A majority of the Cold Test Pit South is open ground and covers approximately 4 ha (10 acres). Two support trailers, a wood storage shed, and a soft-sided tent (yurt) are located at Cold Test Pit South. Figure 3 shows the Cold Test Pit South facilities, roads, and fences.

Cold Test Pit South, a nonhazardous, nonradioactive simulated waste pit area, is used to demonstrate characterization, retrieval, and treatment technologies that may be useful for the remediation of buried waste. The simulated waste pit provides known targets and waste forms for accurate evaluation and calibration of procedures, technologies, and equipment. The mission for the Cold Test Pit South has been to identify, evaluate, and demonstrate various innovative technologies for the remediation of radioactive and hazardous waste buried throughout the DOE complex. The Cold Test Pit South has been identified as a DOE-complex resource for verification and validation of geophysical equipment and systems. It was selected as a test area because it was free of hazardous materials and radiological contaminants and had soil characteristics and depth requirements identified in the design analysis. The design and construction features of this area simulate the TRU waste pits and trenches located in the RWMC SDA. There are no utilities at this site. Drinking water is brought to the trailers via bottles or coolers. Chemical toilets will be provided and serviced through a local contractor. There is limited power to the site and some power is provided through the use of generators obtained and serviced through the Central Facilities Area (CFA) equipment pool.

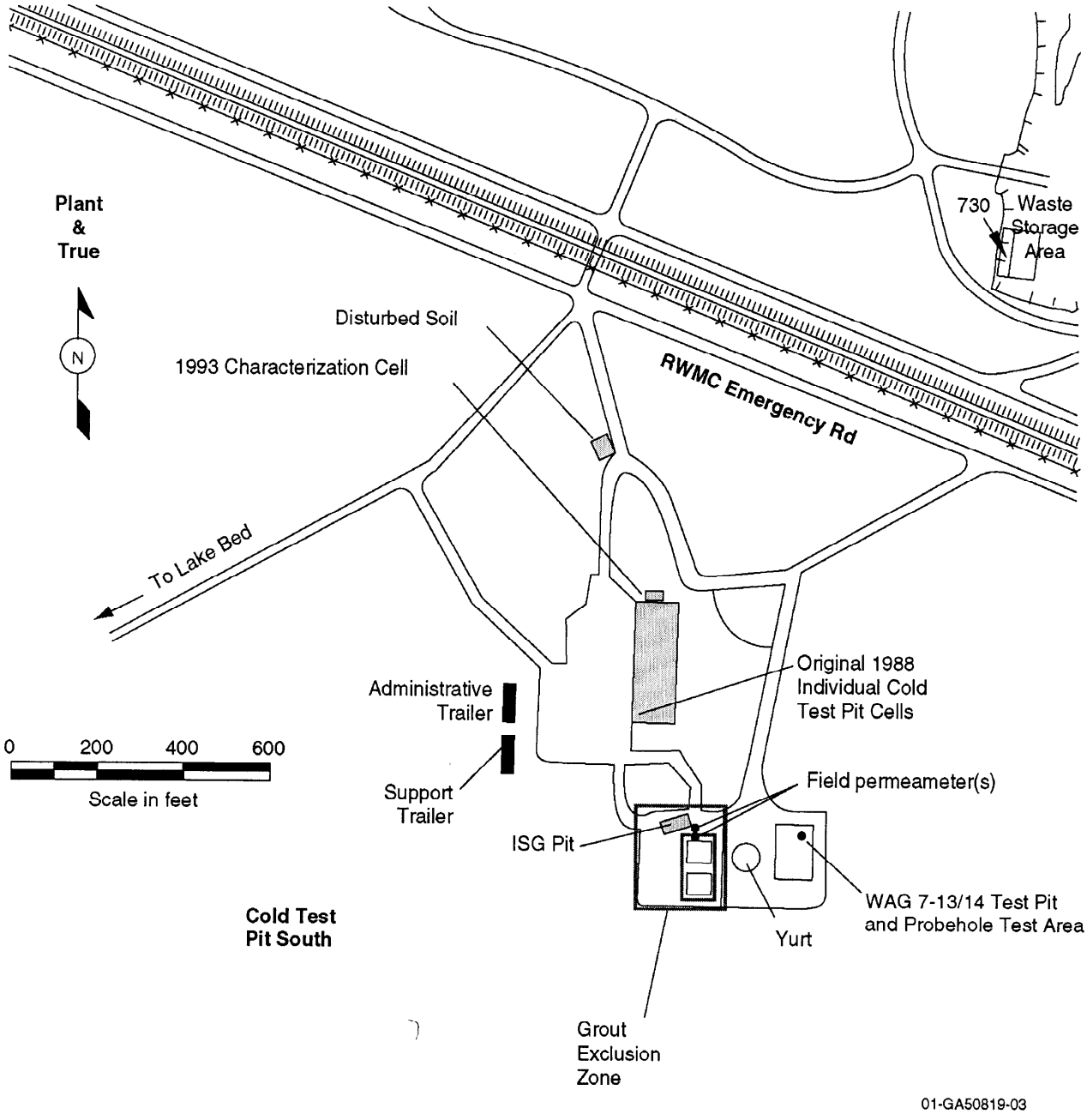

Figure 3. Map of Cold Test Pit South showing facilities, roads, and fences.

1.4.3 Cold Test Pit North

Cold Test Pit North was established in 1999. It is the former site of the portable concrete batch plant for the Pit 9 technology demonstration activity conducted by Lockheed Martin Advanced Environmental Systems. This site is immediately west of the Pit 9 administration area (see Figure 2). The Cold Test Pit North facilities, roads, and fences are illustrated in Figure 4. Three-phase electrical power is available from the RWMC 12.5-kVA loop. An administrative support trailer is staged at the facility for general use.

Currently, the pit contains one test cell, which is being used to support the OU 7-13/14 in situ grouting treatability study (Loomis, Jessmore, and Weidner 2001; DOE-ID 1999). The cell initially was constructed for the OU 7-13/14 in situ vitrification project (Farnsworth et al. 1999). Another cell, which has since been excavated and restored, was used to conduct the dynamic disruption test in 2001. The test supported the in situ vitrification project before its cancellation also in 2001. The cell used for the dynamic disruption test was located south of the existing cell.

2. KEY SITE PERSONNEL RESPONSIBILITIES

The organizational structure for this project reflects the resources and expertise required to perform the work while minimizing risks to worker health and safety, the environment, and the general public. The names of individuals in key roles at the task site and lines of responsibility and communication are shown on the organizational chart in Figure 5. The following sections outline the responsibilities of key site personnel.

Task-site responsibilities included in this section may not be represented on all projects. Only those positions actually assigned to a given project will be represented for the project. Those positions defined and not represented on the project will be for reference only.

2.1 Environmental Restoration Program Director

The INEEL Environmental Restoration (ER) Program director has the ultimate responsibility for the technical quality of all projects, maintaining a safe environment, and the safety and health of all personnel during field activities performed by or for ER. The ER Program director provides technical coordination and interfaces with the DOE-ID environmental support office. The ER Program director is responsible for ensuring that the following are achieved:

- Project and program activities are conducted in accordance with all applicable federal, state, local, and company requirements and agreements
- Program budgets and schedules are approved and monitored to be within budgetary guidelines
- Personnel, equipment, subcontractors, and services are available.

The ER Program director will provide direction for the development of tasks, evaluation of findings, development of conclusions and recommendations, and production of reports.

2.2 Environmental Restoration Safety, Health, and Quality Assurance Manager

The ER safety, health, and quality assurance (SH&QA) manager will be responsible for managing SH&QA resources and ensuring that SH&QA programs, policies, standards, procedures, and mandatory requirements are planned, scheduled, implemented, and executed in the day-to-day operations for the ER operations conducted at the INEEL. The ER SH&QA manager directs the SH&QA compliance accomplishment of all activities by providing technical and administrative direction to subordinate staff and through coordination with related functional entities. The ER SH&QA manager reports to the ER director. Under the direction of the ER director, the ER SH&QA manager represents the ER directorate in all SH&QA matters. This includes responsibility for ER SH&QA management compliance and oversight for all ER CERCLA and RWMC operations planned and conducted at the cold test pits.

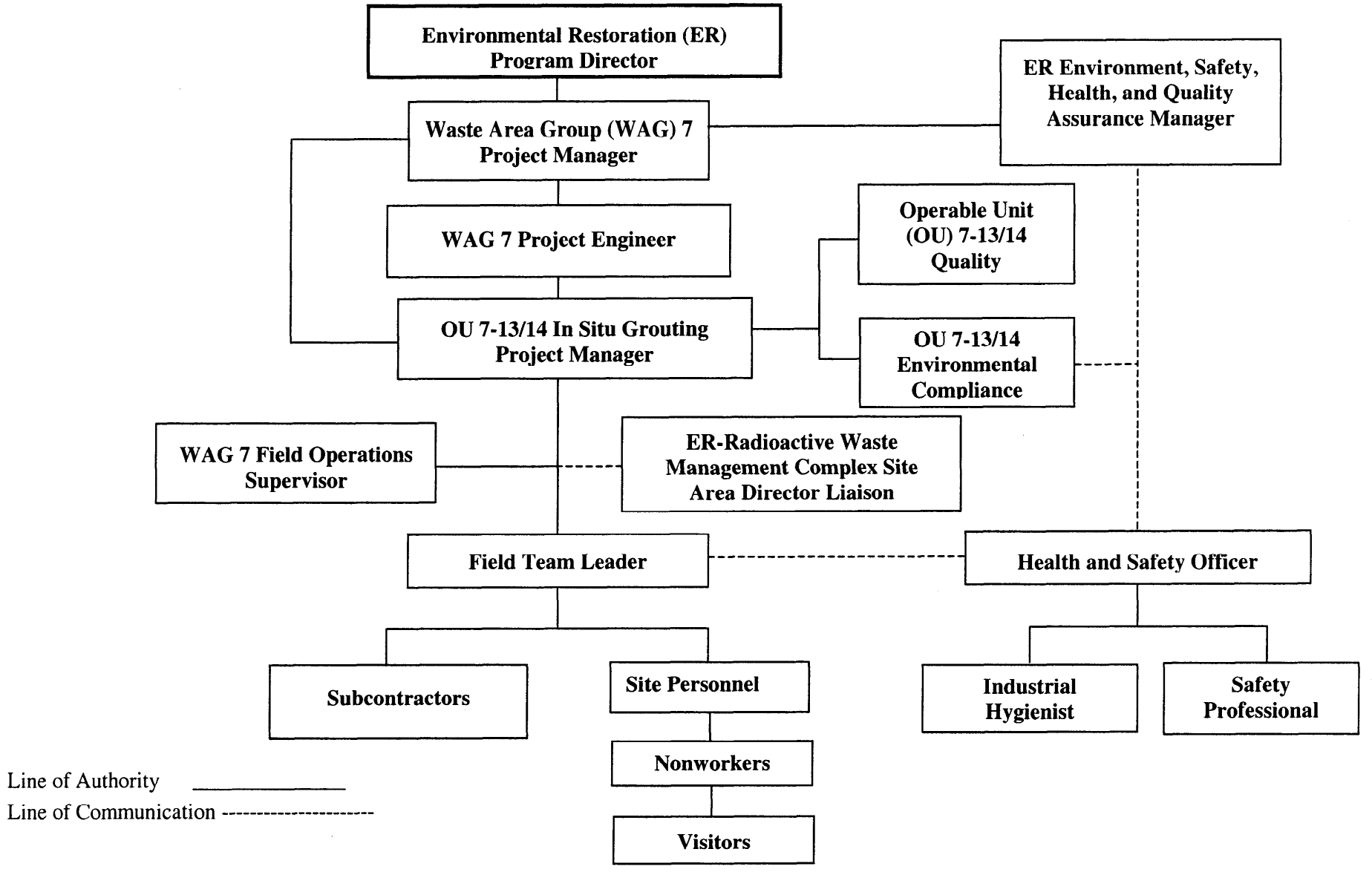

Figure 5. Operable Unit 7-13/14 in situ grouting project organization chart.

The ER SH&QA manager will be responsible for the management of the following technical disciplines and implementation of the programs related to these disciplines:

- Radiological control[a]
- Industrial safety
- Fire protection
- Quality assurance
- Industrial hygiene
- Emergency preparedness.

2.3 Environmental Restoration Waste Area Group 7 Project Manager

The ER WAG 7 project manager is responsible for ensuring that all activities conducted during the project comply with (1) MCPs and PRDs, (2) all applicable OSHA, EPA, DOE, U.S. Department of Transportation, and State of Idaho requirements, (3) the *Project Management Plan, Environmental Restoration Program Management* (PLN-694), (4) the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites* (QAPjP) (DOE-ID 2000b), (5) the HASP, and (6) all project-specific documentation (i.e., sampling and analysis plan, test plan, and work plan). Together, the QAPjP and PLN-694 establish the quality requirements of the INEEL ER Program.

2.4 Specific Project Manager

Each specific project manager coordinates all document preparation and field, laboratory, and modeling activities. The specific project managers are responsible for the overall work scope, schedule, and budget of their projects. The specific project managers are responsible for ensuring that a Form 340.02, "Employee Job Function Evaluation," is (1) completed for all project employees, (2) reviewed by the project industrial hygienist (IH) for validation, and (3) submitted to the Occupational Medical Program (OMP) for determination of whether a medical evaluation is necessary. Each specific project manager ensures that all documentation (including logbook entries) is completed and submitted to document control at the completion of the project.

2.5 Waste Area Group 7 Field Operations Supervisor

The WAG 7 field operations supervisor serves as the principal point of contact (POC) for the identification of resources to ensure the successful completion of WAG 7 activities. Additional responsibilities will include but not be limited to the following:

- Ensuring that the requirements of the project authorization basis are met

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a. Radiological control technicians report directly to the Radioactive Waste Management Complex radiological engineer for technical issues.

- Ensuring that project plan-of-the-day (POD) meetings, tailgate safety meetings, and readiness reviews are performed as required and attended by the appropriate WAG 7 personnel

- Providing input to ER project weekly and monthly project reviews in the form of field progress photos, field operations metrics, field safety statistics and preventive measures, and field labor staffing projections and issues associated with any aspect of field operations

- Being responsible for interfacing with construction management personnel (including subcontractor technical representative) to manage scope, schedule, and cost for field grouting activities as required

- Being responsible for all compliance and implementation of WAG 7 specific field operations, procedures, and requirements

- Providing input to the annual work plan in the form of resource-loaded schedules and staffing projections for field staff

- Coordinating all activities with the appropriate RWMC facilities maintenance and operations managers

- Interfacing with the RWMC landlord regarding office space

- Consulting with the PM, the PE, and the field team leader (FTL) on field labor staffing.

2.6 Field Team Leader

The FTL represents the ER organization at the site with delegated responsibility for the safe and successful completion of the project. The FTL works with the treatability studies project manager to manage field sampling or operations, and to execute the work and test plans. The FTL enforces task-site control, documents activities, and must conduct the POD and daily safety briefings at the start of the shift. Health and safety issues must be brought to the attention of the FTL.

If the FTL leaves the site during work activities, an alternate individual will be appointed to act as the FTL. Persons acting as FTL on the task site must meet all the FTL training requirements outlined in Section 4 of the project HASP. The identity of the acting FTL will be conveyed to task-site personnel, recorded in the FTL logbook, and communicated to the facility representative when appropriate.

In compliance with the requirements outlined in MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews," the FTL will complete the briefings and reviews and submit the documentation to the RWMC site area director (SAD) and the ER SH&QA manager. The FTL will complete the job requirements checklist in accordance with STD-101.

The FTL will be responsible for ensuring compliance with waste management requirements and coordinate such activities with the environmental compliance coordinator or designee.

2.7 Waste Area Group 7 Radioactive Waste Management Complex Site Area Director Liaison

The WAG 7 RWMC SAD liaison serves as the POC for coordination between ER and the RWMC SAD on WAG 7 issues as appropriate. The RWMC liaison provides advance notice (1) to the SAD or designee of scheduled activities including documents requiring RWMC review or approvals that impact site area operations, and (2) of site area operations that impact ER project activities.

2.8 Environmental Compliance

The assigned environmental compliance coordinator oversees, monitors, and advises the WAG 7 field operations supervisor or FTL performing site activities on environmental issues and concerns by ensuring compliance with DOE orders, EPA regulations, and other regulations concerning the effects of site activities on the environment. The project environmental compliance coordinator provides support surveillance services for hazardous waste storage, transport, and disposal.

2.9 Site Personnel

All site personnel, including INEEL, RWMC, and subcontractor personnel, will comply with the requirements of this HASP. The FTL or job-site supervisor will brief site personnel at the start of each shift. During the prejob briefing the following will be discussed: (1) all daily tasks, (2) associated hazards, (3) engineering and administrative controls, (4) required personal protective equipment (PPE), (5) work control documents, and (6) emergency conditions and actions. Input from the project health and safety officer (HSO), IH, and Radiological Control personnel will be provided to clarify task health and safety requirements. All personnel will be encouraged to ask questions about site tasks and provide suggestions on ways to perform required tasks in a more safe and effective manner based on lessons learned from previous activities.

Once at the site, personnel will be responsible for identifying any potentially unsafe situations or conditions to the FTL, job-site supervisor, or HSO for corrective action. If it is perceived that an unsafe condition poses an imminent danger, site personnel will be authorized to stop work immediately then notify the FTL, job-site supervisor, or HSO of the unsafe condition.

2.10 Nonworkers

All people who may be on the site but are not part of the field team will be considered nonworkers for the purposes of this project (e.g., observers, administrative managers, guests, and other personnel not assigned to the project). Personnel will be considered "onsite" when they are present in or beyond the designated support zone (SZ). Nonworkers are deemed "occasional site workers" in accordance with the OSHA HAZWOPER standard (29 CFR 1910.120 and 1926.65), and must meet minimum training requirements for such workers and any additional site-specific training identified in Section 4. If the nature of a nonworker's task requires work within the control zone then that nonworker must meet all the same training requirements as other field team members. A site representative must accompany all nonworkers until they have completed site-specific training.

It will be recognized that treatability studies conducted at the cold test pits are not actual CERCLA or RCRA sites. Nonworkers should not be exposed to hazardous materials during visits to the cold test pits. The nature of treatability studies often requires nonworkers to consult with project personnel and visit or tour the operations for evaluation purposes. Nonworkers will be allowed onsite provided they

receive site-specific HASP training, sign a HASP training acknowledgment form, receive a safety briefing, and wear the appropriate PPE. The FTL will be responsible for monitoring and controlling site visits by nonworkers.

2.11 Visitors

All visitors with official business at the site, including INEEL personnel, representatives of DOE, and state or federal regulatory agencies, may not proceed beyond the SZ without receiving a safety briefing and use the appropriate PPE. A trained site representative (e.g., FTL, HSO, or a qualified designated alternate) will escort all visitors at all times while on the site.

A casual visitor to the site is a person who does not have a specific task to perform or other official business to conduct at the site. Casual visitors will not be permitted on the site.

2.12 Health and Safety Officer

The HSO will be the person assigned to the site who serves as the primary contact for health and safety issues. The HSO advises the job-site supervisor and FTL on all aspects of health and safety and will be authorized to stop work at the site if any operation threatens worker or public health or safety. The HSO may be assigned other responsibilities as stated in other sections of this HASP as long as those other responsibilities do not interfere with the primary responsibilities of the HSO. The HSO will be authorized to verify compliance to the HASP, conduct inspections, require and monitor corrective actions, monitor decontamination procedures if required, and require corrections as appropriate. Environment, safety, and health (ES&H) professionals at the site support the HSO (e.g., safety engineer, IH, radiological control technician [RCT], radiological engineer, environmental coordinator, and facility representative) as necessary.

Individuals assigned as the HSO or alternate HSO must be qualified (in accordance with the OSHA definition) to recognize and evaluate hazards, and will be given the authority to take or direct actions to ensure that workers are protected. While the HSO also may act as the IH, safety engineer, or in some cases the FTL or job-site supervisor,[b] additional site responsibilities requested of the HSO must not conflict[c] with the role of the HSO at the site.

If it is necessary for the HSO to leave the site, an alternate individual (e.g., FTL, job-site supervisor or other knowledgeable person) will be appointed by the HSO to fulfill this role, the identity of the acting HSO will be recorded in the FTL logbook, and site personnel will be notified.

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b. The specific duties depend on the hazards, complexity, and size of the activity involved, and required concurrence from the Environmental Restoration Environment, Safety, Health, and Quality Assurance (ESH&QA) manager.

c. Additional health and safety officer (HSO) responsibilities cannot conflict with the primary responsibilities of the HSO, either philosophically or in terms of significant added volume of work.

2.13 Industrial Hygienist

The assigned INEEL IH will be the primary source for information for nonradiological, hazardous, and toxic agents at the site. The IH assesses the potential for worker exposures to hazardous agents in accordance with the companywide safety and health manuals, MCPs, and accepted industry IH practices and protocol. During participation in site characterization activities, the IH is responsible for performing the following activities:

- Assessing and recommending appropriate hazard controls for the protection of site personnel
- Operating and maintaining airborne sampling and monitoring equipment
- Reviewing PPE for effectiveness
- Assessing and recommending the use of PPE required in this HASP
- Recommending changes to PPE requirements as appropriate.

The IH also will review all employee job function evaluation forms (Form 340.02) to validate the management completion of the form. After validation, the form will be sent to the OMP for scheduling of a medical evaluation as needed.

Following an evacuation, the IH in conjunction with other recovery team members will assist the FTL in determining whether conditions exist for safe site reentry. Personnel showing health effects (e.g., signs and symptoms) resulting from possible exposure to hazardous agents will be referred to an OMP physician by the IH, their supervisor, or the HSO. The IH may have other duties at the site as specified in other sections of this HASP or in PRDs or MCPs. During emergencies involving hazardous materials (HAZMATs), airborne sampling and monitoring results will be coordinated with members of the emergency response organization (ERO).

2.14 Safety Engineer

The assigned INEEL safety engineer will review work packages, observe site activity; assess compliance with the companywide safety and health manuals, coordinate with other ES&H disciplines as required, sign safe work permits (SWPs), advise the FTL on required safety equipment, answer questions on safety issues and concerns, and recommend solutions to safety issues and concerns that arise at the site. The safety engineer may have other duties at the site as specified in other sections of the HASP or in PRDs and MCPs.